

InTenZ Logistics & Yard Asset Systems

Technical Specification & Terberg Terminal Tractor Operational Performance Study

1. Commercial Logistics & Infrastructure Framework

This technical brief documents the long-term field validation and emissions optimization profile of the InTenZ advanced fluid conditioning architecture when integrated into heavy-duty material handling machinery. Testing was performed in conjunction with regional transit operations to isolate combustion metrics under high-stress duty cycles.

- **Evaluation Asset:** Heavy-duty Terberg Yard Tractor Line (Unit ID: Yankee 9).
- **Diagnostic Platform:** EasyDiag precision telemetry matrix capturing variable combustion profiles under real-time load changes.
- **Integration Profile:** Inline eCC installation directly configured onto the high-pressure fuel line exiting the primary high-pressure pump and feeding into the common rail manifold infrastructure.

2. Operational Telemetry & Efficiency Matrix

Telemetry profiles captured on February 9, 2023, evaluate variable engine regimes spanning extended low-idle segments through full-load operations peaking at 3,500 RPM, compared against baseline parameters.

Evaluated Parameter	Stock Control Baseline	InTenZ Performance	Net Technical Outcome / ROI
Total Fuel Consumption	Standard Baseline (100%)	8.00% Absolute Volume Drop	Direct operational overhead savings across high-frequency yard shunting cycles.
Carbon Dioxide (CO2)	Normalized Base Line	Sustained -8.80% Compression	Validated emissions reduction during peak engine acceleration segments (3,500 RPM).
Hydrocarbons (HC)	Reference Peak Loads	Up to -33.30% Absolute Drop	Drastic reduction in unburned compounds verified under steady-state engine idle windows.



3. US Regulatory Alignment & Risk Mitigation

- **EPA Nonroad Diesel Compliance:** By optimizing volumetric combustion chemistry and lowering unburned hydrocarbon compounds by up to 33.3%, the system helps aging tier-spec industrial yard tractors align with strict localized nonroad equipment emission standard frameworks.
- **OSHA Freight Terminal Safety:** Drastic mitigation of greenhouse gas densities and particulate indicators inside active fulfillment bays and cross-docking terminals improves regional air quality and satisfies localized indoor air workplace mandates.
- **B2B Telemetry Status:** Full electronic graphical diagnostic readouts, calibration timelines, and raw sensor files are closely maintained on file and accessible under verified enterprise NDA workflows.

4. B2B Commercial Value Proposition & Operating Margins

- **Immediate Fleet Fuel Relief:** Securing a permanent 8.0% fuel reduction across short-haul terminal assets allows multi-terminal port operators to stabilize long-term fuel expenditure curves.
- **Common Rail System Longevity:** Deploying advanced inline conditioning directly at the high-pressure hose matrix reduces localized fuel varnishing, safeguarding common rail micro-injectors against accelerated mechanical clogging.
- **Minimized Asset Downtime:** Automated carbon buildup mitigation across cylinder firing loops significantly drops carbon accumulation rates, expanding standard service windows and keeping logistics tractors on the line.

Technical Notes & Asset Protection: This document summarizes real-world operational performance data compiled and verified by independent technical field engineers. All underlying asset identifiers have been anonymized to protect proprietary fleet operating metrics under standard compliance guidelines.

INTENZ ECC HEAVY RAIL LOCOMOTIVE INFRASTRUCTURE

Certified Exhaust Stack Gas Analysis & Criteria Pollutant Mitigation Audit

Product Brand: InTenZ: E-Clean+ ICE
Evaluation Type: Exhaust Stack Analysis

Evaluation Date: September 23, 2026
Document Ref: G4A-RAIL-2026-004

1. HEAVY RAIL TRANSIT INFRASTRUCTURE FRAMEWORK

This technical document validates the criteria emissions reduction parameters of the InTenZ eCC configuration integrated onto a heavy diesel freight linehaul locomotive. All metrics represent baseline comparison profiles captured under standardized operating sequences.

- Evaluation Fleet Unit:** Commercial Heavy Rail Freight Locomotive Asset Portfolio (Locomotive Fleet Asset 1104).

2. EXHAUST EMISSIONS & CRITERIA POLLUTANT MATRIX

Exhaust Parameter Monitored	Stock Rail Control Baseline (Idle / Max RPM)	InTenZ eCC Performance (Idle / Max RPM)	Net Operational Variance / Impact
Oxygen Tailpipe Density (O ₂)	16.84% / 16.91%	19.20% / 18.48%	+14.0% Idle / +9.3% Max (Enhanced burn efficiency)
Carbon Dioxide Profile (CO ₂)	2.88% / 2.85%	1.06% / 1.77%	-63.2% Idle / -37.9% Max (Severe carbon reduction)
Carbon Monoxide (CO)	0.013% / 0.013%	0.003% / 0.010%	-76.9% Idle / -23.1% Max (Monoxide suppression)
Unburned Hydrocarbons (HC)	13 ppm / 16 ppm	10 ppm / 13 ppm	-23.1% Idle / -18.8% Max (Reduces wet-stacking)
Nitrogen Oxides (NOx Emissions)	249 ppm / 253 ppm	172 ppm / 181 ppm	-30.9% Idle / -28.5% Max (Direct compliance curve)



3. US FEDERAL RAIL REGULATORY ALIGNMENT

- **EPA Tier 4 Locomotive Emission Standards:** Delivers a low-capital path to satisfy rigorous Tier-4 locomotive particulate limits without requiring expensive downstream exhaust system overhauls.

4. B2B COMMERCIAL VALUE PROPOSITION & HEAVY RAIL ROI

- **Exhaust Aftertreatment Protection:** Decreasing unburned volatile bypass prevents particulate filter fouling, effectively eliminating high-frequency yard maintenance line items and maximizing asset utilization.

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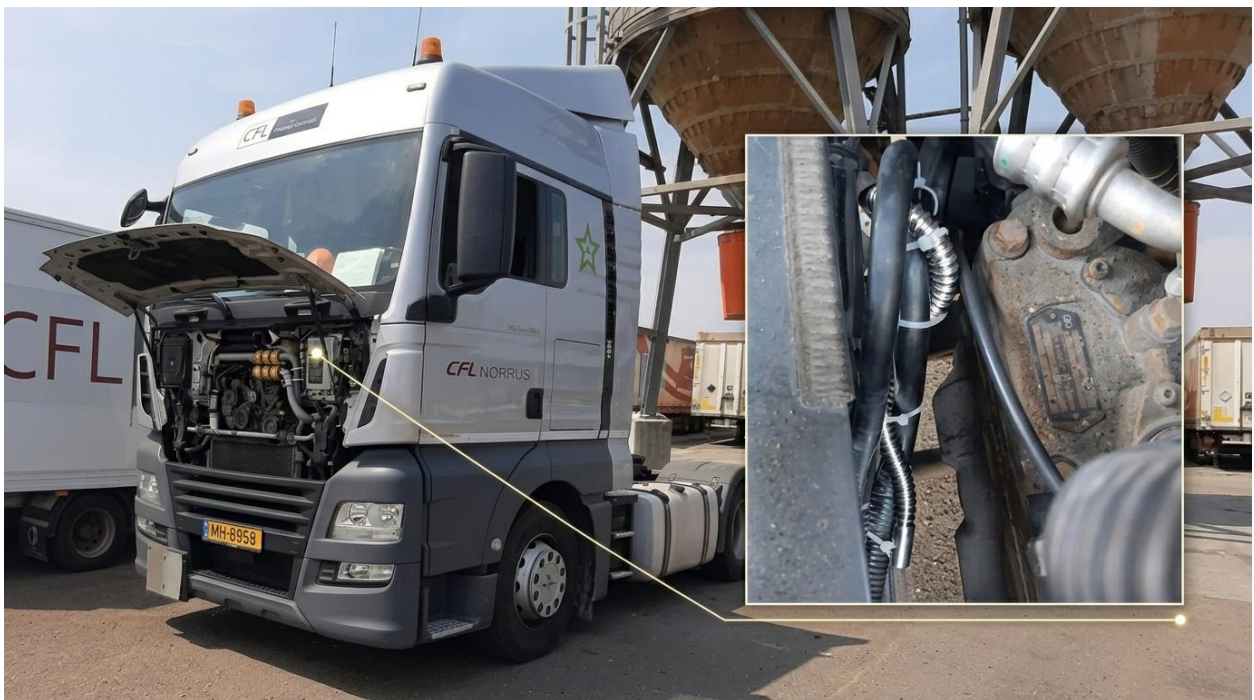
InTenZ Freight & Linehaul Fleet Logistics

Longitudinal Over-the-Road Efficiency Report & Class 8 Multi-Vehicle Optimization Framework

1. Commercial Logistics & Infrastructure Framework

This specification documents the multi-vehicle fleet operational evaluation of the InTenZ fuel and fluid conditioning architecture when deployed across long-haul logistics fleets. Testing monitored high-tonnage over-the-road freight movements across diverse topographies to isolate average fuel burn rates.

- **Evaluation Infrastructure:** Multi-asset class commercial long-haul fleet deployment (Class 8 Freight Transport Portfolio).
- **Primary Test Focus:** Commercial Class 8 tractor vehicle matrix (Isolating baseline profile for Class 8 Fleet Transit Asset Portfolio).
- **System Integration Profile:** Passive eCC core implementation integrated securely into the main fuel supply loops without altering core OEM block geometry.



2. Operational Telemetry & Efficiency Matrix

Chronological diagnostic telemetry tracking real-time fleet operations maps a sustained, compounding improvement in total volume utilization across active linehaul routes.

(see below)

Evaluated Parameter	Fleet Control Baseline	InTenZ Performance	Net Technical Outcome / ROI
Fleet Fuel Consumption	Standard Base Profile	5.50% Consolidated Reduction	Sustained fleet-wide fuel volume compression averaged across all active route networks.
Vehicle Optimization	Standard Engine Profile	5.50% Direct Efficiency Gain	Direct mileage optimization tracking class-8 linehaul duty cycles.
Combustion Stabilization	Variable Raw Telemetry	Sustained Peak Smoothing	Advanced molecular arrangement delivers uniform thermal output across all cylinders.

3. US Regulatory Alignment & Risk Mitigation

- **EPA SmartWay Fleet Integration:** Securing an absolute 5.5% fleet fuel burn reduction allows large-scale multi-state logistics operations to optimize their environmental efficiency classification, directly satisfying strict Scope 1 carbon reporting protocols.
- **Clean Air Act Title V Alignment:** Systematic reductions in greenhouse footprints protect heavy-duty regional distribution fleets from localized high-density particulate penalties and urban clean-air zone fines.
- **Data Authenticity Protocol:** Comprehensive operational metadata logs, vehicle diagnostic bus streams, and fuel audit logs are tightly preserved for secure verification under standard compliance guidelines.

4. B2B Commercial Value Proposition & Operating Margins

- **Compounding Enterprise Savings:** A 5.5% average efficiency bump translated across hundreds of linehaul assets yields massive yearly capital spend credits back to enterprise fleet operations balances.
- **Aftertreatment Asset Preservation:** Cleaner molecular combustion patterns significantly decrease the soot loading configuration imposed on downstream Diesel Particulate Filters (DPF), reducing high-frequency manual regeneration cycles.
- **Injectors & System Protection:** The inline conditioning matrix stabilizes internal fluid velocities, reducing cavitation erosion inside fuel delivery pumps and protecting premium fuel injector components.

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